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REMARKS

In complete response to the outstanding Official Action of April 1, 2002, on the above-identified application, reconsideration is respectfully requested.

Claim Amendments

Claims 25, 26, and 30 have been amended to remove the word "said" and replace it with the definite article "the", in order to exhibit consistent usage of antecedent references.

Claims 15 through 19, and 21 through 30 have been amended to ensure consistent usage of the phrases "air injection level" and "oxygen enrichment concentration". Applicant respectfully believes that this overcomes the associated indefiniteness rejections.

Claim 15 has been amended to remove the limitation "with two air injection levels is retrofitted to three levels" and substitute the limitation "that originally had two air injection levels that have been retrofitted with a third air injection level". Applicant respectfully believes that this overcomes the indefiniteness rejection for Claim 15 and Claims 16 through 18 dependent therefrom. Examiner notes that Claim 19 is dependent on Claim 15, however Claim 19 is an independent Claim.

Claim 15 has been amended to include the term "the three levels being primary, secondary and tertiary air injection levels", in order to provide adequate antecedent bases for Claims 16 through 18. Support for this can be found in the specification on Page 2, Lines 19 through 25.

Claim 15 has been amended to include the term "wherein the ratio of total oxygen to total combustion air at any air injection level is the oxygen enrichment level for that air injection level", in order to provide adequate antecedent bases for Claims 16 through 18. Support for this is found in § 2173.05 (e) of the M.P.E.P. which states that "there is no requirement that the words of a claim must match those used in the specification disclosure". Applicant feels that this term is one commonly used by those skilled in the art, and is defined with a reasonable degree of clarity and precision.

Claim 19 has been amended to alter the limitation "the method comprising applying oxygen enrichment to at least the secondary and one or more of third and fourth air levels" to read "the method comprising applying oxygen enrichment to the secondary air injection level and one or more of third and fourth air injection levels". Applicant respectfully believes that this overcomes the indefiniteness rejection with regard to multiple sets of alternative language for Claim 19 and Claims 20 through 24 dependent therefrom.

Claim 19 has been amended to include the term "wherein the ratio of total oxygen to total combustion air at any air injection level is the oxygen enrichment level for that air injection level", in order to provide adequate antecedent bases for Claims 20 through 24.

Claim 25 has been amended to alter the limitation "or a recovery boiler with an original two level air injection system retrofitted to three levels as described above" to read "or a recovery boiler with an original two level air injection system retrofitted to three air injection levels"

Claim 25 has been amended to alter the limitation "selecting a desired oxygen concentration in the flue gas called set point concentration" to read "selecting a desired set point oxygen concentration". Antecedent support for this amendment is found in the specification at Page 6, Line 18.

Claim 25 has been amended to remove the definite article "the" from the phrases "the oxygen concentration" and "the flue gas", in order to provide adequate antecedent bases for the remaining elements within Claim 25.

Claim 26 has been amended to alter the limitation "selecting a desired oxygen concentration in the combustion products called set point concentration" to read "selecting a desired set point oxygen concentration". Antecedent support for this amendment is found in the specification at Page 7, Line 9.

Claim 26 has been amended to remove the definite article "the" from the phrases "the oxygen concentration" and "the flue gas", in order to provide adequate antecedent bases for the remaining elements within Claim 26.

Claims 27 and 28 have been amended to alter the phrase "to improve the combustion stability or chemical recovery of a recovery boiler" in their preambles, to read "to improve the combustion stability of a recovery boiler" in their preambles. Concurrently, Claims 31 and 32 have been added, and include the phrase "to improve the chemical recovery of a recovery boiler" in their preambles. Applicant respectfully believes that this overcomes the indefiniteness rejection with regard to multiple sets of alternative language for Claims 27 and 28.

Claims 27 and 28 has been amended to alter the phrase "sulfur dioxide SO_2" to read "sulfur dioxide", and to alter the phrase "SO_2" to read "sulfur dioxide", in order to provide more consistent usage of antecedent references.

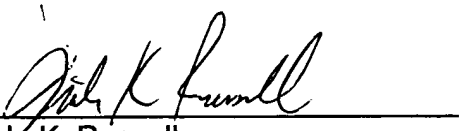
Claim 30 has been amended to alter the limitation "selecting an optimal temperature profile for the boiler based on the prior knowledge of the boiler operation, called set point temperature profile" to read "selecting a set point temperature profile". Antecedent support for this amendment is found in the specification at Page 8, Line 22.

It is submitted that the above amendments overcome the 35 U.S.C. 112 rejections, by more clearly defining the invention. This ground of rejection is believed to be unsustainable and should be withdrawn.

Accordingly, it is believed that the present application now stands in condition for allowance. Early notice to this effect is earnestly solicited.

Should the Examiner believe that a telephone call would expedite prosecution of the application, he is invited to call the undersigned attorney at the number listed below.

Respectfully submitted,



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Stacy Forte

CLAIMS AS AMENDED

15. (Amended) A method to increase [the] throughput of a recovery boiler applicable to boilers with at least three air injection levels, the three levels being primary, secondary and tertiary air injection levels, or boilers that originally had two air injection levels that have been retrofitted with a third air injection level [with two air injection levels is retrofitted to three levels], the method comprising injecting oxygen at least at the secondary and the tertiary air injection levels, wherein the ratio of total oxygen to total combustion air at any air injection level is the oxygen enrichment concentration for that air injection level.

16. (Amended) Method in accordance with claim 15 wherein oxygen enrichment concentration is applied to the primary air injection level [stream] in addition to the secondary and tertiary air injection levels [streams].

17. (Amended) Method in accordance with claim 15 wherein recovery boiler has the same oxygen enrichment [level] concentration in the secondary and tertiary air injection levels, the oxygen enrichment [levels] concentrations being greater than 21%.

18. (Amended) Method in accordance with claim 15 wherein the recovery boiler has different oxygen enrichment levels in each air injection level, the [concentration of oxygen] oxygen enrichment level being greater than 21% in each air injection level.

19. (Amended) A method of increasing [the] throughput of a recovery boiler applicable to boilers with at least four air injection levels, the four levels being

primary, secondary, third and fourth air injection levels, the method comprising applying oxygen enrichment to [at least] the secondary air injection level and one or more of third and fourth air injection levels, wherein the ratio of total oxygen to total combustion air at any air injection level is the oxygen enrichment concentration for that air injection level.

20. Method in accordance with claim 19 wherein oxygen enrichment is applied to the primary air injection level in addition to the secondary and fourth air injection levels.

21. Method in accordance with claim 19 wherein the recovery boiler has the same oxygen enrichment [levels] concentrations in the primary, secondary and tertiary air injection levels, the oxygen enrichment [levels] concentrations being greater than 21%.

22. (Amended) Method in accordance with claim 19 wherein the recovery boiler has different oxygen enrichment [levels] concentrations in each air injection level, the [concentration of oxygen] oxygen enrichment concentrations being greater than 21% in each air injection level.

23. (Amended) Method in accordance with claim 19 wherein the recovery boiler has oxygen [concentrations in combustion oxidant] enrichment concentrations up to 30% in the primary, secondary, and tertiary air injection levels [of combustion air].

24. (Amended) Method in accordance with claim 19 wherein the recovery boiler has oxygen [concentrations in combustion oxidant] enrichment concentrations up to

30% in the primary, secondary, and third and fourth air injection levels [of combustion air].

25. (Amended) A method of controlling [the] oxygen concentration in [the] flue gas of a recovery boiler [when oxygen enrichment of the combustion air is applied], the method being applicable to boilers with at least three levels of air injection, or a recovery boiler with an original two level air injection system retrofitted to three air injection levels [as described above, said] the method including the steps of:

a) supplying oxygen flows to at least two [combustion] air injection levels of the recovery boiler, [said] the two [combustion] air injection levels being different from the primary air injection level, for oxygen enrichment of the [said] the two [combustion] air injection levels;

b) selecting a [desired oxygen concentration in the flue gas called] set point oxygen concentration

c) sensing the oxygen concentration in the flue gas;

d) adjusting the oxygen flow injected in the tertiary [combustion] air injection level, in order to maintain the sensed oxygen concentration at about the set point oxygen concentration, while maintaining the flow of oxygen in the secondary air injection level [combustion air] constant.

26. (Amended) A method of controlling [the] oxygen concentration in [the] flue gas of a recovery boiler [when oxygen enrichment of the combustion air is applied], the method being applicable to boilers with at least four levels of air injection, the method comprising the steps of:

a) supplying oxygen flows to at least two [combustion] air injection levels of the recovery boiler, [said] the two [combustion] air injection levels being different from the primary air injection level, for oxygen enrichment of the [said] the two [combustion] air injection levels;

b) selecting a desired [oxygen concentration in the combustion products called] set point oxygen concentration;

c) sensing the oxygen concentration in the flue gas;

d) adjusting the oxygen flow injected in the upper most [combustion] air injection level, in order to maintain the sensed oxygen concentration at about the set point oxygen concentration, while maintaining the flow of oxygen in the other air injection level [of combustion air] constant.

27. (Amended) A method to improve [the] combustion stability [or chemical recovery] of a recovery boiler [where oxygen enrichment is applied to at least one injection level of the combustion air system at the primary air injection level] comprising the steps of:

a) supplying oxygen flows to the primary air injection level of the recovery boiler for oxygen enrichment of the primary air;

b) sensing [either one or all of the following quantities: reduction efficiency of the smelt,] the sulfur dioxide [SO_2] concentration in flue gas [, or bed temperature];

c) adjusting the oxygen flow injected in the primary [combustion] air injection level [,] in order to [obtain at least one of the following effects on either or all

of the following quantities: reduction efficiency above 90% and] minimize [SO_2] sulfur dioxide emissions.

28. (Amended) A method to improve the combustion stability [or chemical recovery] of a recovery boiler [where oxygen enrichment is applied to at least one level of the combustion air system at the secondary air level] comprising the steps of:

a) sensing [either one or all of the following quantities: the reduction efficiency of the smelt,] the sulfur dioxide [SO_2] concentration in the flue gas [, or the bed temperature];

b) adjusting the oxygen flow injected in the secondary [combustion] air injection level, in order to [obtain the following effects on either or all of the following quantities: keep the reduction efficiency above 90%,] minimize the [SO_2] sulfur dioxide emissions.

29. (Amended) Method in accordance with claim 28 wherein the oxygen enrichment concentration in the oxidant in each air injection level of oxygen enriched air injection is controlled independently.

30. (Amended) A method of controlling temperature profile in a recovery boiler [when oxygen enrichment of the combustion air is applied], [said] the method including the steps of:

a) supplying oxygen flows to at least two [combustion] air injection levels of the recovery boiler, [said] the two [combustion] air injection levels being different from the primary air injection level, for oxygen enrichment of the [said] the two [combustion] air injection levels;

b) selecting [an optimal temperature profile for the boiler based on the prior knowledge of the boiler operation, called] a set point temperature profile;

c) sensing average temperatures at different levels of the boiler with an optical technique, and inferring a temperature profile to the boiler, adjusting the oxygen flow injected in [said] the at least two [combustion] air injection levels so that the measured temperature profile matches the boiler set point temperature profile.

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31. (New) A method to improve the chemical recovery of a recovery boiler [where oxygen enrichment is applied to at least one air injection level of the combustion air system at the primary air injection level] comprising the steps of:

a) supplying oxygen flows to the primary air injection level of the recovery boiler for oxygen enrichment of the primary air;

b) sensing the reduction efficiency of the smelt;

c) adjusting the oxygen flow injected in the primary air injection level, in order to obtain a reduction efficiency above 90%.

32. (New) A method to improve the chemical recovery of a recovery boiler where oxygen enrichment is applied to at least one air injection level of the combustion air system at the secondary air injection level comprising the steps of:

a) sensing the reduction efficiency of the smelt ;

b) adjusting the oxygen flow injected in the secondary air injection level, in order to obtain a reduction efficiency above 90%, wherein the ratio of total oxygen to total combustion air at any air injection level is the oxygen enrichment concentration for that air injection level.

33. (New) Method in accordance with claim 32 wherein the oxygen enrichment concentration in the oxidant in each air injection level of oxygen enriched air injection is controlled independently.